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VIEWS, NEWS AND INTERVIEWS.

There is a report current in New York city that a Washington electrical man had an interesting "green goods" experience during a recent visit to the metropolis. He was overheard to remark that he had discovered at last how certain electrical men were able to live so well; they simply "made money."

One of the first signs of growth and life in the smaller cities is the introduction of the trolley, says the New York *Sun*. Half a dozen years ago a New York capitalist went to Syracuse to make some investments. In front of his hotel a horse car stopped for 20 minutes and then began its return trip. The capitalist packed his grip and returned to New York, remarking that a town of 20-minute horse cars was not a place for his money. To-day Syracuse is threaded with trolley cars and has grown in population since then some 25,000. That same year another traveler stopped in Auburn one Sunday, and, after a morning walk, brought up at the top of Genesee street hill, a fashionable part of the town, and entered a horse car. After a quarter of an hour the conductor was asked when the car would start. "When church is out," he answered. The only Sunday cars were run to the churches and sent back when they closed.

The inventory of Jay Gould's estate shows that he owned 220,028 shares of stock in the Western Union Telegraph Company. At the appraised value of 85 this is worth $18,702,500. The total appraised value of the Gould estate is over $80,000,000.

Consul Chancellor at Havre, in a report to the State Department, says private carriages have been lighted by electricity in France for the past five years, and that this process of illuminating private conveyances has recently extended to London and Berlin, the Prince of Wales being the first to adopt it. England and the German Emperor have given the order to do away with the unsatisfactory lighting of the court carriages by the substitution of electricity, not only the outside lanterns and the interiors being lighted from accumulators, but small colored lights, which glow like fire flies, are placed all over the harness. It is stated that the cost of an installation for a private carriage is only about $50.

SNOQUALMIE FALLS, STATE OF WASHINGTON, OWNED BY THE SNOQUALMIE FALLS ELECTRIC POWER COMPANY. Height 268 feet, or 103 feet higher than Niagara.

THE SNOQUALMIE FALLS ELECTRIC POWER COMPANY.

FALLS TWO HUNDRED AND SIXTY-EIGHT FEET HIGH GIVING FIFTY THOUSAND HORSE-POWER TO BE USED TO GENERATE ELECTRIC POWER.

The illustration on this page gives an impressive view of the Snoqualmie Falls, Wash., which develop a theoretical energy of 51,607 horse-power. The height of the falls is 268 feet, or 103 feet higher than Niagara Falls.

The Snoqualmie Falls Electric Power Company has been formed to develop and deliver by electrical transmission 5,000 horse-power at Seattle, Wash., where about that amount of power is now generated by steam at a cost of over $60 per horse-power per year, and used for electric lighting, electric and cable railways and manufacturing establishments. The company proposes to furnish power at $30 per horse-power per annum. This company has acquired 350 acres of land on both sides of the river, thereby controlling the power of Snoqualmie Falls in Kings County, State of Washington, 23 miles eastward from Seattle. This is the largest water power in the State, and is said to be the most advantageously situated for inexpensive development.

The company will be capitalized at $2,000,000 and is authorized to issue $1,000,000 bonds, $650,000 of which will be issued at once. The directors

of the company are Daniel H. Gilman, of Seattle; Hon. Watson C. Squire, of Seattle, United States Senator; Griffith Davies, Postmaster of Seattle; Hon. Smith M. Weed, of New York; Chas. W. Wells, of Brown & Wells, New York. Mr. R. M. Smythe, 452 Produce Exchange, New York city, represents the company in the East and is engaged in floating its securities.

The Snoqualmie Falls Power Company has recently found a demand for power and light from an unexpected source. Along the line of transmission are a number of large coal mines. These mines use for pumping, hoisting and lighting over 1,000 horse-power, which they generate by the use of their own coal. The superintendent of one of these mines has offered to take their power from the Snoqualmie Falls company at $30. He says it will pay them to use it, as the cost will be no greater than at present and the danger from fires and hot steam pipes will be avoided.

OBITUARY.

James F. Brown, a well-known electrical supply dealer of Lansing, Mich., died on January 6.

Maurice C. McIntire, a member of the firm of W. C. McIntire & Company, electrical engineers of Philadelphia, died on January 6 of appendicitis. He was one of the best known athletes in the Schuylkill Navy, and was a man of fine physique.

We regret to announce the death of Mr. F. P. Little, of the F. P. Little Electrical Construction and Supply Company, Buffalo, N. Y. Mr. Little was well known in electric lighting circles, and had installed a large number of plants, principally in New York State. His death was indirectly due to an accident caused by being thrown from a carriage a short time ago. In December he had an operation performed from which he never fully recovered.

American Bell Telephone Company Appeals From the Berliner Decision.

The American Bell Telephone Company has appealed to the United States Circuit Court of Appeals from Judge Carpenter's recent decision declaring the Berliner patent, No. 463,569, void. Among the errors assigned by it to the rulings of Judge Carpenter are, that the Court should have dismissed the bill in equity, which was brought by the United States; that the court should have found that the Berliner patent was for a different invention from any that was patented; that the court should have found that the Bell company always intended and always did prosecute its application for the patent in suit with diligence and with intent and purpose to secure the issue of the patent at the earliest practicable day.

One evening last week seven trolley cars linked together conveyed the Night Whist Club, of Bridgeport, Conn., to Southport for a dance. The six miles were made in 14 minutes.

CLEVELAND'S LACK OF LIGHT.

Visitors to the Electric Light Convention Next Month Should Take Along Lanterns.

INTERESTING REVIEW OF THE SITUATION IN THIS GROWING CITY BY AN UNPREJUDICED CORRESPONDENT—THE DOMINATION OF GAS AND VAPOR INTERESTS—MR. CHAS. F. BRUSH ON THE QUALITIES OF THE ARC LAMP—THE METER SYSTEM AND ITS SAVINGS—SUBURBAN LIGHTING.

To the Editor of Electrical Review:

It might reasonably be supposed that Cleveland, being the home of the inventor of the Brush arc light, would be one of the best lighted municipalities in the United States. The supposition would be wrong. Cleveland is a city of strange contradictions. It is also one of the worst lighted cities of the West. There are small towns within a radius of 50 miles that can boast of far superior lighting plants to those of this city of over 300,000 inhabitants. The citizens of Florence and Rome, far from the center of electric controversy, whose forefathers were wont to hang lighted lanterns in front of their dwellings, both as a protection against thieves and to illuminate the shrines that were conspicuous thereon, are to-day blessed with a lighting service after dark that is superior to that of Cleveland. The progressive American is often apt to forget that his is not the only country in the world, and the citizens of Cleveland have lost sight of the fact that the inventor of the arc light has extended his illuminating lamp to the ancient metropolises of Europe, while his own city will not do him the reverence to depart from the miserable vapor lamps and the not much better gas lamps that pretend to throw some light upon darkness.

Within the past two months there has been much agitation for better street lighting in Cleveland. Indirectly it has been fought by both the vapor lamps and the gas companies. They appear to have an influence of some kind with the city officials in their effort to help out the well meant intentions of the moon. It is probable that Cleveland will be better lighted. In connection with the discussion of better lighting Mr. Charles F. Brush was induced to make a few remarks. He prefaced them by saying that he had been so long out of the electric business that he had forgotten many of the details, and the comparative cost of electric and gas lighting. He was asked as an expert of lighting to give some information as to the relative illuminating power of gas and electricity. In reply he asserted there should be no real question so far as the merits of the two methods of artificial light were concerned. Said he:

"The foes of electric street lighting have been very unfair in their arguments. They will, for instance, take a newspaper and go to some remote point from an electric light. Then holding the printed page up will declare they cannot read it. On the contrary, they will take the same newspaper under a gas lamp and point to the fact that it can be read with ease. So it might be under an electric light. The point is always to try to throw aspersion upon the 'carrying ability' of the electric light's rays. If it were not for the lower carbon in the arc light the greatest power of illumination would be under the crater of the upper carbon. The lower carbon is a necessity, and the measurement of candle-power cannot be taken from a direct perpendicular. It is estimated, however, in the most acute angle that can be devised from the light. With the widening of the angle the candle-power must necessarily be lessened, for the rays of the light are diffused over a wider surface. At the line parallel with the street the candle-power will be least of all.

"An electric arc light is rated at about 80 times greater than gas. Rating gas lamps at 16 candle-power the arc light would be 1,280. As light diminishes as the square of the distance, you may rate the candle-power of electricity at 81, so as to get the square foot easier, which is nine. Therefore, you will see between two electric lights and two gas lights at the same distance apart the point of least illumination, which is midway between the two, will be nine times greater in the case of electricity than in gas. The Brush people are turning out more arc lights now than in any time of their history, and I do not know of a single corporation that has abandoned gas for electricity that ever has returned to the old system."

So much for Mr. Brush's ideas about the use of electricity and gas for street lighting. He does not make the claim that electricity is cheaper than gas, but declares that it renders a much better light and that less of it goes much further. If municipalities are looking for light without merit they might as well employ the light of vapor lamps which is good from the fact that it is better than no light at all.

Cleveland still adheres to the worn out system of mast lighting in many of the few lamps that are used in the city. It is true that some of the old masts have been taken down, but three are suffered still to remain. They are of very little use and are monuments to a system that demonstrated its worthlessness. Where the merchants and men of influence have substituted electricity on the principal business streets, an effort has been made to have the lighting done from lamps that are suspended by wires from the center of the street. Euclid avenue is handsomely lighted by electricity. From the business portion of the city to Willson avenue, a point about two miles out, the system of suspended street lamps has been employed to good effect. However, it is the only residence street throughout the city that has been granted that privilege. By far the larger number of streets are lighted with gas, which is obtained cheaply, owing to a contract with the gas company that followed closely upon a war to reduce the rates. The suburban streets and the streets in the less important residence districts are lighted by the uncertain vapor lamps.

Six miles from the center of the city is the terminus of the Euclid avenue line of the Cleveland Electric Company. From that point to Collamer one of the most novel systems of lighting in the country has been introduced. The railroad company operates a line to Collamer, which is a suburb some 10 miles out, and by means of the current used through the motor wire a system of incandescent lights is kept in operation. Thus it is that Euclid avenue is lighted for a distance of four miles in the country. The incandescent lights are bunched in fours and are hung in the center of the street at suitable intervals. It is a fine arrangement for the people and the railroad. The road is much traversed, especially in Summer, and the lights overhead result in great good to those driving, for they are enabled to avoid collision. The motormen on the cars can see safely a reasonable distance ahead.

Since the Cleveland Electric Light Company employed the meter system they have lost some of their customers, who have returned to gas. Others, who could afford to do so, placed electric plants of their own in their stores and hotels, and the result has been that fewer subscribers are reported for lights. However, the saving that has been made by the use of meters is said to have sufficiently recompensed the company for the change.

The towns immediately surrounding Cleveland, as before asserted, are better equipped for lighting purposes than the metropolis of the region. Akron, Norwalk, Canton and Sandusky have excellent plants and strange so say their light is brighter, better and gives more general satisfaction. However, the smoke that settles so thickly over Cleveland will ever be a disadvantage to pure light, while, on the contrary, it makes more light necessary throughout the day hours. Many days in Winter it is necessary to keep the lights burning almost constantly from the time that business is begun in the morning until the establishments are closed at night. Undoubtedly this was one reason why the lighting company felt it necessary to place meters in buildings which they served, as they were providing electricity 24 hours in succession at a 12-hour rate.

The subject of electric light is agitating several of the corner settlements along the line of the suburban street railways. Between Norwalk and Sandusky on the line of the electric railroad, operated as described in the Electrical Review, there are three settlements of some population where an effort is to be made to get the railroad company to permit the tapping of the wire in order to furnish electric light. It may not be uncommon in Northern Ohio, after the lapse of a few years, to find electric lights at every railroad crossing.

In closing this article, concerning the use of electricity for lighting purposes in Cleveland, attention must be called to the excellent plant by which Mr. Brush illuminates his magnificent residence on Euclid avenue. The motive power to operate the dynamos and generate the electricity is a huge windmill that is erected in the rear of his residence. The electricity is stored and at night there is an abundant supply for the house. The scheme is thoroughly practical, and palatial summer houses remote from a center of electrical supply might be illuminated in the same manner.

Cleveland, January, 1895. F.

ON ELECTRICAL TERMS.

BY G. P. HACHENBERG, M.D., AUSTIN, TEXAS.

There was an era in science whenever a great discovery was made it was usually christened with the name of the inventor. There is less of this now, except in the development of some wonderful feature in physical philosophy. Such a nomenclature virtually means nothing in particular to those that have no knowledge of the personal relationship of the inventor to the subject. Some of these terms may take ages to become descriptive to the general understanding of the scientific world, as Galvanism, Fahrenheit's scales, Leyden jars, Ruhmkorff's coil, Guillotine, etc. They are perfectly admissible when they are ephemeral and where they are strictly in the adjective and possessive, as in Daniell's battery, Morse's alphabet, etc.

In the electrical profession we have sadly fallen into the error of attaching proper names, in place of giving scientific descriptive terms to many features of electricity. Nothing is more important than to have correct and accurate ideas of electrical units. But when using such terms as volt, ampere, coulomb, farad, watt, joule, henry, etc., all proper names with no descriptive adjunct they mean to most persons nothing in connection with the nature of the subject involved. It is like a man's name, which alone does not reveal his character. George Washington was a man of rare integrity, and never told a lie; in the South we have many hundred negroes of the same name who hardly ever tell the truth.

All electrical terms could be made mathematically descriptive, and it might often be proper to render them in Greek or Latin, as we find in the French metric system of weights and measures. These languages now live and have their habitation in science, and are only "dead" to the non-Solomonic majority.

But even classical and foreign terms may prove objectionable, as is the case with the metric system to a good portion of the reading population. The metric system is now accepted by all civilized countries, but owing to its foreign and classical nomenclature, with a total exclusion of English, it has never been fairly accepted in the line of trade in this country, even including in this statement the medical profession.

Botany, chemistry, anatomy, pathology, philosophy and metaphysics are rife with these terms. It appears the medical profession at one time took the lead in this mystification of their lore. It is burdened with such terms as: Bright's disease, Grinder's asthma, Dover's powder, Fowler's solution, Scarpa's triangle, Glisson's capsule, Hesselback's nerve, Warton's duct, etc., etc. To clear up this mass of confusion, as far as diseases and surgery were concerned, I rendered a list containing about 200 proper names explanatory in my "Medical Consultation Book" of recent publication.

But the medical profession of late years in its different departments of science has adhered more to a descriptive nomenclature, in particular in chemistry and anatomy. Glauber's salt, called so for the last 200 years in honor of a German chemist, is now better known as sulphate of soda, a descriptive term, and well understood by anyone versed in drugs. On this common sense plan electrical terms could be advantageously appropriated.

We know that proper terms in science are introduced in honor of persons who distinguished themselves on subjects bearing their names. If it were intended to confer in this manner immortal fame upon great scientists the desired effect will surely seldom be realized, for, in course of time, these names are detached to make place for more intelligent terms. How would our present terms of electrical units read centuries hence? Harder to decipher would they seem to be than the Egyptian hieroglyphics.

A few years ago I saw in print a statement that an electrician asked Edison what he understood by these terms of electrical units. The great inventor promptly answered, saying that he knew nothing about them. I will venture to say that comparatively few electricians take the trouble to make themselves familiar with the entire list. No doubt the terms are all intended to mean something, and if they were given in a descriptive meaning, the literature of electricity would be greatly improved.

However, proper terms are not without their use, aside from their ostensible object of introduction; they are freely resorted to in speculative philosophy and scientific discussion to serve as a drapery of great learning at times, regardless of the nature of the subject under consideration. The egotist loves to parade them to add respectability and lustre to his own views.

General Electric Company's Standard Panel Switchboard.

Advances made in the electrical art are nowadays all in the direction of economy, and the patient attention to details results now in the elimination of that expense now in the reduction of this. As an example, in isolated plant engineering the design and construction of the switchboard has generally occupied a large amount of time with consequent expense usually out of proportion to the size of the contrast. To reduce this expense the General Electric Company has standardized a form of switchboard, of panel type similar in this respect to those successfully known in its railway work. The panels are of two kinds, one for the generator and one for the feeders. They are of black enameled slate, in two finishes, mounted on a steel frame. Flanges on the frames permit of the panels being connected side by side to form one uniform whole. The generator panels are built in 11 capacities running from 3 to 100 kilowatts at 125 volts, or from 24 to 800 amperes maximum, and all are 48 inches high and 16 inches wide. Each generator panel carries one triple pole single throw switch with fuses, one Carpenter enamel field rheostat, one round dial ammeter and a pilot lamp, all being electrically connected behind the panel. The common bus bars on all the panels being the same distance apart, connection of the bus bars by a copper tie bar connects the panels together electrically. Except in the method of connection, the three and two-wire panels do not differ.

The feeder panels are made in two sizes, 48 inches high by 16 inches wide for the two-wire, and 48 inches high and 26 inches wide for the three-wire system. The two-wire panel carries double pole feeder switches with fuses, one round dial voltmeter reading to 125 volts, one two-wire push button ground detector. The three-wire panel carries triple pole single

GENERAL ELECTRIC COMPANY'S STANDARD PANEL SWITCHBOARD FOR ISOLATED PLANTS.

throw switches with safety catches, two voltmeters and one ground detector. The three-wire panel carries triple pole single throw switches with safety catches, two voltmeters and one ground detector. All the connections are complete and immediate installation is effected by soldering in the feeder ends and generator leads and connecting the two bars together with tie bars.

These switchboards are made for support either by brackets, upon a hollow pedestal, or the framework may be continued down to the floor and the open space filled by blank panels, as shown in the illustration. This method is generally recommended.

The simplicity of construction and ease of installation of these panels, together with the advantage of increasing their capacity without impairing the uniform appearance of the switchboard, have already commanded a wide appreciation among electricians.

LETTERS FROM OUR FRIENDS.

"AN OLD SUBSCRIBER" WAKES UP AND BREAKS OUT.

TO THE EDITOR OF ELECTRICAL REVIEW:

What is the matter with the ELECTRICAL REVIEW anyhow? Wherefore the change from the even tenor of its exquisite urbanity towards all in low and high places? What mean the strains of ire, the awe-inspiring shaking of the hyperion curls on thy Jove-like brow? Why doeth thou denounce with trombone epithets the baldhead of an advertising-grabbing sheet, and disturb an innocent and innocuous desuetude? Is it not written, "Give to him that asketh thee (for an advertisement), and from him that would borrow (troubles) of thee turn not thou away?"

Thank Heaven that thou needeth no padding nor pulling of wool over the eyes of thy readers, and kindly, I pray thee, temper the wind to the shorn lamb whose strength and power, methinks, will soon be but a shadow and a name.

AN OLD SUBSCRIBER.
St. Louis, Mo., January 8, 1895.

ON THE DEATH OF W. W. SMITH.

TO THE EDITOR OF ELECTRICAL REVIEW:

I am pained to learn through the ELECTRICAL REVIEW of the death of Mr. W. W. Smith. The "kindly qualities" of which you speak never impressed anyone more quickly and enduringly than they did the writer. The tribute you pay his memory is true, and as I remember him your picture is exactly as he looked, and it attests the truthfulness of your concluding lines.

HENRY D. STANLEY.
Passaic, N. J., January 4, 1895.

THINKS WE'RE "ARTFUL" AND "FAR-SIGHTED" AND "COINING MONEY."—WRITE AGAIN "L. D."

TO THE EDITOR OF ELECTRICAL REVIEW:

What an artful young man you are! To advise the telephone people to look up the expiring Edison patents. To be sure you are very far-sighted—to say the least. Why not ask Edison what he thinks about the matter? Don't he like to be interviewed?

Dear me! What a short-sighted policy your brother publisher Johnston is following—it must be coining money for the REVIEW. L. D.
Lowell, Mass., January 10, 1895.

BRIEF BUT POINTED AND SATISFACTORY EXTRACTS.—A FEW OUT OF HUNDREDS.

Enclosed is check of $3 for ELECTRICAL REVIEW for year 1895.—KERR & CURTIS, N. Y.

Enclosed check of $3 is for the ELECTRICAL REVIEW for one year.—JOHN P. P., Philadelphia.

I have been a subscriber to the —— ——. I now wish to transfer my affections to the ELECTRICAL REVIEW. Enclosed is $3. Please begin with first issue of '95.—WM. Q., Colorado.

Please send me your paper from January 2, 1895. Enclose check for one year.—GEO. W. B., Fort Wayne, Ind.

We have the pleasure to send you bill of exchange for $5 on Messrs. Thomas Cook & Son, for ELECTRICAL REVIEW for 1895. — NOWROSJEE WADIA & SONS, Bombay.

In the same mail that brought the above letter from India, there were 12 other new subscribers to the REVIEW for 1895—a lucky 13 in all.

TELEPHONE NEWS AND COMMENT.

The private line telephone is on the increase—big.

The Anthony Electric Company wants to establish an exchange in Dayton, O.

It is reported that the Pan Electric Telephone Company is breathing the breath of life again.

The New York and New Jersey company begins the new year with over 10,000 telephone subscribers.

The telephone rate bill is now in the hands of the Cities Committee at Albany, N. Y. It is similar to the last one.

Lewiston and Auburn, Me., are figuring on a co-operative exchange. Just what that means developments may tell.

The Police Board of Detroit is going to put in its own telephone exchange. They use about 250 instruments.

A new long distance toll line has been extended out from Altoona, Pa., through Cambria County, opening up a good territory.

Leavenworth, Kas., has granted a franchise to a new telephone company. President Mulvane, the eyes of the Bell interests are on you !

Summerville, S. C., the Winter resort, now has long distance telephone service to Charleston. The distance is 26 miles and the service is fine.

About 3,000 of the 5,000 shares of stock offered for sale by the American Bell remains unsubscribed for by stockholders. It will, therefore, be sold by auction.

The appeal of the American Bell Telephone Company from Judge Carpenter's decision in the Berliner patent case to the United States Court of Appeals has been made.

Some of the new telephone companies are reported to be just a trifle tired. All who succeed in this field will know there has been a contest before arriving at Easy street.

The Clark Automatic Telephone Company is announcing its determination to put in a test exchange at Le Mars, Iowa. If Clark has a successful automatic exchange, Clark has a good thing.

At Asbury Park, N. J., the subscribers who don't like to pay present rentals refuse to answer telephone calls. This is another new method of getting even with the company, and worrying the innocent operator.

Springfield, Ohio, telephone subscribers are resolving that they must have cheaper rates. Three hundred strong they ask for this or out goes the talkee, talkee. New telephone companies should watch Springfield.

We wonder, indeed, why don't some of these millionaires who are investing in new telephone companies get hold of Wm. Marshall's "book telephone?" It possesses some beauties that excel all the others—and besides it talks.

Erie Telegraph and Telephone Company made a net gain of 79 subscribers in December, 284 for the three months ending December 31, and 672 for the fiscal year. Total number connected January 1, 16,085.

John Bowlus is trying to get subscribers for a new telephone exchange in Indianapolis. John Bowlus will likely stumble over a few boulders before he gets the conditions precedent—1,800 subscribers and $200,000 local capital.

C. P. Wainman, general superintendent of the Northwestern telephone exchange system, is planning some large extensions of telephone lines for 1895. Mr. Wainman will now be under the surveillance of wire and pole manufacturers.

The Harrison Telephone Company is talking of building a large telephone factory, probably in or near Chicago. The Harrison company should have a good big factory if they establish exchanges in all the places they have secured franchises.

A French railway has lately arranged its telegraph lines so that at a prearranged signal the wires are switched from the telegraphic instruments to telephones, thus enabling the operators either to talk verbally or to communicate by the telegraphic code at will.

The New York and New Jersey Telephone Company will put the wires of the Police Department of Newark under ground and get $20,000 for the job of interment. The wires will go into holes left for them when the telephone wires were conduited a year ago.

It is reported in McKeesport, Pa., that the backers of the new telephone exchange are badly scared over the rumor that the Bell company will give free service for two or three years at that point. This *will* be a novelty. We'll keep an eye on McKeesport and report.

At Knoxville, Tenn., the People's Telephone Company is evidently giving the East Tennessee Telephone (Bell) Company some hard knocks. It has 400 subscribers, an established exchange and is securing five-year contracts at $35 per annum. The old company will fight, and offers free service for 30 days.

That New York and Eastern Telephone Company, organized in New Jersey to do business in Brooklyn, is beginning to wonder why it was born. Every time it raises its head it gets a whack. When last heard from it was suffering from the concussion of two vetoes and one judgment. It was evidently born to die young.

A telephone company named the Phœnix, of Indianapolis, is the possessor of a franchise at Wabash. An automatic exchange is already on the ground, or rather in the air, belonging to the Central Union company, but it isn't quite automatic enough, and 125 subscribers have registered with the new salamander.

The syndicate, which was formed some months ago for the purpose of introducing cheap telephones in this city, seems to have sunk into oblivion. There is a rumor on the street to the effect that this company has sold its charter and all rights to the New England Telephone and Telegraph Company for a good, round sum.—*Portland Express.*

"We want to know ?"

A telephone line has been built by Mr. George W. Carroll between Jewett City and Voluntown, Rhode Island, a distance of some 10 miles, and the instruments are the property of the subscribers. People who use this line say the sensation of not having to pay toll to a "bloated monopoly" is simply delightful. The statement, however, that the cost per paragraph over this line is higher than monopoly rates, we give, but haven't had time to confirm !

The Harrison company is going to charge $30 per year for business telephones and $18 per year for residence telephones in Lafayette, Ind., making two exchanges. The Central Union company had about 275 subscribers there, and the Harrison starts in with 400. There ought to be facilities enough to talk in that town with two exchanges buzzing every day and night. Lafayette wouldn't know his town should he materialize for a half hour about 11 A. M.

B. Markle has begun suit against the Wisconsin Telephone Company for $10,000 for malicious imprisonment. He claims that in January, 1893, he was arrested at the instance of the company on a charge of stealing some apparatus of the company, and that he was brought from Chicago to Milwaukee by the police and searched in the Central Police station. If when Markle was searched no poles or cross-arms or switchboards or bluestone batteries were found on his person, it would seem as though he had a good case.

At Port Huron, Mich., when the Harrison company secured a 30-year franchise — whew ! — trouble is reported. Before securing the franchise representatives of the company canvassed the city and secured about 250 subscribers. Some of these claim that the company promised to have their system in working order by January 1. The company has been busy putting in their system but as yet have only about completed setting the poles. It is reported that the old company will reduce rates, and if that is done it may retain many of the subscribers who were going to patronize the new company.

THE ELECTRO-CHEMICAL ACTINOMETER—ITS DISCOVERY AND PRACTICAL USES.

SPECIALLY PREPARED FOR THE "ELECTRICAL REVIEW" BY V. M. BERTHOLD, FROM M. CH. MARÉCHAL'S PAPER READ BEFORE THE FRENCH ACADEMY, OCTOBER, 1894.

Actinometers, *i. e.*, instruments which are affected by luminous radiations, have been known ever since Becquerel published his experiments with silver salts. His labors were continued and carried on by numerous physicists, among others Grove, Hankel, Egoroff, Pellat and Grivaux.

Recently, Messrs. Gouy and Rigollot have found that an oxidized copper plate placed in a chloride, bromide, or iodide solution becomes very sensitive to luminous radiations, even of an extremely low intensity.

This discovery formed the basis of a long and protracted series of experimentations, conducted jointly by Messrs. Rigollot and Ch. Maréchal, finally culminating in the invention of the new electro-chemical actinometer.

This very simple apparatus consists of but two thin copper strips, one of which is brightened or polished and then covered with a light protecting envelope (paper or paraffin), while the surface of the other is oxidized. The oxidation is effected by holding the strip over a Bunsen burner, noticing carefully the various colors of the metal as the temperature is increased, and withdrawing the strip when it appears of a bright orange color. It is then placed upon a cold, metallic block and chilled. The entire process requires but a few minutes. The two strips may then be placed in a saline solution, and the apparatus is ready for work.

Joining the strips to a galvanometer by means of connecting wires and then causing luminous radiations to impinge upon the oxidized strip, an electric current flows from the illuminated to the electrode protected against light radiations. Indeed we may say that one electrode is at a higher actinic potential than the other.

It is also found that the addition of various coloring substances to the liquid in which the actinometric electrodes have been immersed changes the electro-motive force considerably, and this is a point of great practical importance because it enabled the experimenters to use the actinometer for commercial purposes, as will be seen later on.

A second point of importance consisted in the discovery that by submitting the "actinometric cell" to a charge from a voltaic couple, say a single Daniell, its sensitiveness as regards luminous radiation may be increased.

M. Maréchal has experimented with a great many salts, either pure or tinted by the admixture of coloring substances, and has laid down his results and observations in numerous charts, which should be consulted by all those who are specially interested in this branch of physical science. It may suffice to state that each solution produces a certain electro-motive force, which may be increased by the addition of a certain coloring substance. He has also carefully studied

the relation existing between the colored light and the corresponding degree of electro-motive force by throwing parts of a spectrum upon the oxidized copper strip, and a full exposition of this part of the subject will be found in the paper.

As the physical explanation of the effect of luminous radiation upon the actinometer is still under deliberation,

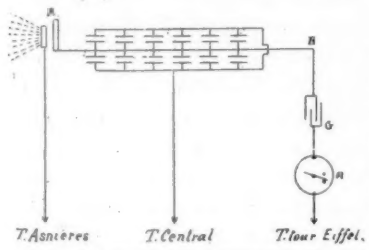

FIG. 1.—DIAGRAM OF ACTINOMETER TESTS.

we will at once proceed to the description of some experiments, made to test practical applicability of the actinometer, and its efficiency as a transformer of luminous into electrical energy.

The actinometer enables us to transform luminous radiations or signals, such for example as are employed in optical telegraphy, into electrical signals which may be received on any of the ordinary telegraphic apparatus. Numerous experiments prove that with sunlight as the source of radiation the actinometer operates efficiently over a line from eight to ten kilometers (6.2 miles). Trials with artificial light during daytime proved, however, unsuccessful, because the superior radiation of the sunlight at once overpowered the inferior light energy of the artificial source. In other words, with the actinometer luminous energy is transformable at a distance, if the source of radiation has an actinic potential superior to that of the exposed electrode of the actinometer.

A series of practical tests took place in the laboratory of Posts and Telegraphs to which M. Maréchal is attached. In these tests one terminal of the actinometer A was joined to an artificial line of 4,500 ohms and 142 microfarads capacity, the other being grounded at Asnières (see Fig. 1). In order to prevent the receiving apparatus, placed at the Eiffel tower, from being disturbed by earth currents, a condenser G of 27 microfarads capacity was inserted into the end of the line before passing through the receiver, the latter being grounded at the Eiffel tower. In fact this artificial line closely resembled the submarine cable joining Marseilles and Algiers. As soon as a luminous signal is focused upon the actinometer A, the needle of the receiver R moves, while during the withdrawal of the light, the actinometer remains absolutely motionless.

Another practical adaptation of the actinometer to submarine telegraphy consists in its employment as a rapidly operating luminous relay whereby luminous signals may be recorded upon any ordinary telegraph apparatus.

The most promising method is shown in Fig. 2. Two actinometers are placed upon a slide rule, replacing the transparent scale of a Thomson mirror galvanometer. Both actinometers are connected with a specially constructed receiver; the actinometer at the right of the drawing operates when the line current moves the spot of light to the right, while the actinometer placed at the left side becomes active as soon as the luminous spot moves to the left. Accordingly as one or the other actinometer becomes energized, the receivers throw their lever or armature to the right or left contact stop, and thus produce upon an endless moving paper strip the points or dashes of the Morse alphabet; or, if it is preferred to use a siphon recorder, sinuous lines above or below a straight median line may be registered.

We have also studied with this simple apparatus the strength of daylight at the different hours of the day. For example, at Lyon the maximum light effect is a little after 12.30 P.M. From a series of such and similar tests the experimenters have been led to compare the curves representing the diurnal changes of terrestrial magnetism (and especially those of the declination), with the curves representing the maximum light effect at a given terrestrial point.

Without entering here into a full exposition of the various reasons and facts which caused M. Maréchal to make such a comparison, and which can be found in the published report of his paper read before the French

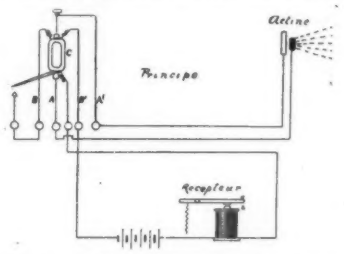

FIG. 2.—ACTINOMETER USED FOR LUMINOUS SIGNALLING.

Academy, November, 1894, it may be sufficient to state that Messrs. Mascart and Joubert have long ago believed that our earth should be considered simply as a closed electric circuit moving in a magnetic field, subject to the constantly fluctuating effects of luminous energy. Indeed, as early as 1834, M. Ame thought that there existed a close relationship between thermo-electric currents produced by the sunlight on the surface of the earth and the diurnal variations of terrestrial magnetism.

M. Maréchal has taken pains to examine this theory experimentally, and, if possible, to verify it by means of his actinometer. In regard to this work, M. Maréchal writes as follows:

We know that as soon as the sun enters the northern hemisphere, the North pole of the compass, *i. e.*, the end which points north, is deflected east during the hours from 8 A.M. to 1 P.M.; during the night the needle moves back to its former position. In other words, the movements of the needle are affected by the hourly position of the earth towards the sun, and it is evident that these variations of magnetism depend upon the effect of the sunlight upon the earth.

On the other hand, examining again the changes of the compass needle we find that in the northern hemisphere of the earth the North pole moves westward from 8 A.M. to 1 P.M., returning to its original position during the night. It is likewise evident that the movements of the declination needle are symmetrical on both sides of the equator.

A long series of observations proves that at a given point of the globe, say at Paris, the amplitude of the daily variations of magnetism is much greater in Summer than in Winter, while at the Cape of Good Hope, situated in another hemisphere, the daily variations are much greater in Winter than in Summer. We are thus led to the conclusion that the focus, or center of the disturbance, moves with the sun. But what is true for the variations of the declination needle is also true in regard to the variations of the dipping needle. During the Winter they are much weaker in Paris, for example, than during the Summer, while the opposite effect is noticed at the Cape of Good Hope. In trying to explain these changes in terrestrial magnetism, we are forced to conclude that the luminous rays of the sun, impinging upon the surface of the earth, produce physical as well as chemical changes, which in turn excite electrical currents which cause and direct the motion of the magnetic needles. In fact, these currents must be constantly flowing from east to west, in order that the magnetic needles should place themselves everywhere in a certain direction.

Now, as the actinometer proves that currents flow from the less illuminated to the most illuminated part of the actinometer electrodes, and pretty nigh in proportion to the luminous intensity employed, it seems natural to assume that the terrestrial currents should be found flowing towards or around the most illuminated point or area of the globe. Such area or point is, however, not stationary, but moves, as we have seen, with the position of the sun, and in fact moves all round the earth within 24 hours.

The electrical currents thus excited may be compared to currents of great frequency, but short duration, and they diffuse themselves into the surrounding atmosphere, where they are again subject to the influence of light, as has been shown by Elster, Geitel and others. On account of their source (*i. e.* the chemical action of ultra violet rays, the actinic action of rays of minor refrangibility, or thermo electric effects due to the heating of the surface) such currents may be called "cosmical" currents.

Obeying the law of symmetry, the

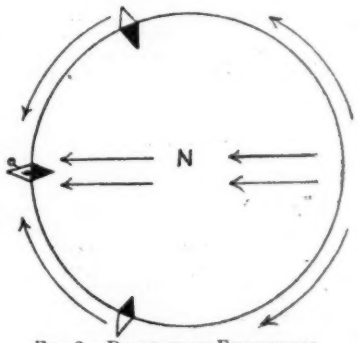

FIG. 3.—DIAGRAM OF EQUATORIAL CURRENTS.

sum total of electrical energy thus developed causes two directive actions on each side of the equator, creating, as it were, two equally strong currents in the field, and if a magnetic needle (see Fig. 3), is placed upon the luminous near the astronomic equator, the declination compass should remain stationary, because the two opposite directive forces or currents neutralize one another.

The same law should apply to the dipping needle, and experience proves the correctness of the theory. In other words, the maximum of cosmic electricity, developed by the undulations of light energy, should be found in the regions of our atmosphere near the equator. This again is proved by actual experience, because the frequency and intensity of storms is greatest at the equator, decreasing towards the poles of the earth.

In other words, the atmosphere may be considered an immense condenser (see Fig. 4), its armatures consisting (as has been pointed out by E. Thomson) of the surface stratum of the globe and the rarefied region of the atmosphere, which is a good conductor. Now, as the condenser discharges take place at the point of nearest approach between the two armatures (in our case at a point near the axis of rotation), we may further conclude that our terrestrial magnetic polarity is produced by condenser discharges, because the direction of these discharges of opposite polarity on each side of the equator.

We thus have at once a clear and lucid explanation of the phenomenon called "aurora borealis," the atmospheric condenser discharges being exactly like the well-known luminescence phenomena in Geisler tubes, produced by Tesla in a strong magnetic field by currents of high frequency. The changes in color of the zodiacal light may well be explained as depending upon the thickness of the air strata and the intensity of the current which traverses through them. And as by necessity the direction of these currents is in opposition to the cosmic currents produced by the sunlight, we also understand why the zodiacal light produces disturbances in the terrestrial magnetism. The presence and changes of terrestrial currents, frequently observed on telegraph lines, is another proof of the correctness of the theory.

Taking two points on the surface of the globe, for example, A and B, connected by a conductor and at the same actinic potential, no current will flow through the said conductor. But if, on the other hand, A receives less actinic energy than B, a current will flow from A to B. Of course, these are merely local currents, but there are other currents which have been well observed, the direction of which is north to south.

M. Joubert, who has long and closely studied terrestrial currents, says: "When we compare the maxima of the curves representing telluric currents with the maxima of the curves representing magnetic variations, a close inter-relation of the two becomes at once apparent, with this remarkable difference, however, that the maxima of the one correspond to the zero points of the other. Assuming then that the globe is a closed circuit moving in a field, the great telluric currents are but secondary, induced, or Foucault currents, developed in the closed circuit, their intensity depending upon the angular rotatory speed of the closed circuit."

This assumption equally well explains that the earth on account of the resistance of the medium in which it turns is subject to the law of acceleration, and these powerful telluric or Foucault currents, according to the law of Lenz, tend to oppose motion or acceleration, thus serving in a certain sense as an electric power brake.

It is also true that if the axis of rotation of the earth were perpendic-

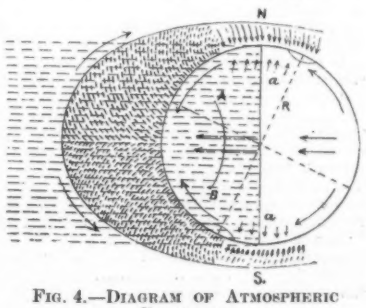

FIG. 4.—DIAGRAM OF ATMOSPHERIC CURRENTS.

ular to the direction of the flux of luminous energy, the earth could not turn because the two great directive forces would be symmetric in the field. The inclination of the earth's axis of rotation is thus the angular difference of the two circuits.

In conclusion, it becomes also apparent why sunspots, *i. e.*, a diminution of the flux of luminous energy, affect our magnetic needles.

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We publish on another page a communication from Dr. A. H. Monell, in which he asks for an intelligent discussion of the effects of electricity on that painful disease, rheumatism. Our columns are open to such a discussion, and we shall be glad to hear from electricians as well as physicians.

In this issue of the ELECTRICAL REVIEW will be found an interesting and lucid description of the electro-chemical actinometer, a new combination of old principles, which has been developed into an instrument that may prove of considerable importance in certain branches of electrical work.

The city of Kingston, N. Y., has a Board of Trade which is stirred up over "a proposed new electrical industry" which has been brought to their attention by two out-of-town promoters. One of these promoters is quoted as saying that "the company had the nucleus for developing the most successful electrical concern in the world, and that these men who propose to locate in Kingston are the best informed men in the world in their profession. Each is simply without a peer in his branch of the profession. Not only that; two of the gentlemen are the possessors of most valuable patents and have more knowledge of the business than all the rest of the employés of any one similar factory combined." All this has a very fishy sound and we would advise the good people of Kingston to be cautious.

Col. John A. Cockerill, the distinguished journalist, left Monday of this week for Japan, where he will represent the New York *Herald*. No man in the profession stands higher in point of ability and character, and his work from this new and important diplomatic point will be closely observed throughout civilization. A delightful dinner given by Mr. E. S. Stokes to Col. Cockerill and a few of his most intimate friends was enjoyed at the Hoffman House Sunday night. The warm words of sincere well wishes for the Colonel's success in the realm of the Mikado, and the cordial sentiments of esteem and affection that the occasion gave expression to, must be a pleasing thought to the eminent traveler now speeding across the continent to take ship at San Francisco. There were present besides the host and guest of honor, Henry Guy Carleton, Major M. P. Handy, ex-Mayor Hugh J. Grant, Chas. W. Price, Gen. Daniel Butterfield, Marshall P. Wilder, William Berri, H. C. Davis (of Chicago), John C. Osgood, Joseph Koch, J. B. McCormick, R. W. Criswell, Dr. Wendell C. Phillips, Capt. Geo. L. Norton. The ELECTRICAL REVIEW extends to Colonel Cockerill cordial well wishes and predicts additional honor to his name and the great journal he will most ably represent.

ELECTRIC POWER ON A STEAM RAILWAY.

The general adoption of electricity as a motive power on steam railways may not be as far in the future as some people imagine, and what may prove to be an important preliminary step has already been decided upon by the management of the N. Y., N. H. & H. R. R. Co. This is no less than the equipment of certain of their branch roads with electricity and the determination to give it a thorough practical test on lines heretofore operated by steam. The first road to be thus equipped will probably be the one from Boston to Nantasket Beach, and the conditions are favorable for demonstrating the efficiency of the rival motive powers in a most thorough manner. If the results are what those interested anticipate they will be, the adoption of electricity on the company's four track system between Boston and New York will be a natural consequence, and from its bearing on the future, if from nothing else, the results of the innovation will be watched with interest. Vice-president John M. Hall, of the N. Y., N. H. & H. R. R., in his annual report for 1892, touched upon the possibilities of electricity as applied to steam roads, and as he is deeply interested, and there are few better authorities on the subject, it may be taken for granted that the proposed experiment is undertaken with a definite object in view, and if successful will not be allowed to stop short of its utmost development.

The Western Electric Company alleges that the Harrison Telephone Company infringes its call-box switch, magneto call-box and the automatic-crank switch, covered by the patents of Watson, Gray and Scribner. The Harrison company says it doesn't, and that it has a sustaining decision from the United States Circuit Court of Arkansas. The question is now before the United States Circuit Court at Chicago. The Harrison company has a good lawyer on its board of directors—the Hon. Geo. R. Peck.

For the first time in its history the United States Patent Office has caught up with its work in all departments, and applications for new patents can now be acted upon in proper course. We congratulate the office on this satisfactory state of affairs.

The Drawbaugh telephone interests are reported to be about ready to enter the lists. Then we shall see a Bell competitor equipped with experience, ability and capital.

Wall Street and the Electrical Stock Market.

Wall street has about reached the conclusion that the present Congress will not give to the financial world needed currency legislation, and strange as it may seem the matter is made a subject of congratulation. The administration has afforded the public two specimens of currency reform bills. The last was buried on Wednesday, and now capitalists are waiting with a feeling akin to assurance for Republican ascendency in Congress, believing it will be followed by an intelligent, comprehensive and equitable currency reform measure. The feeling rendered the bear party very uneasy, caused it to cease selling stocks short, and induced many to start covering their outstanding contracts. This imparted an appearance of strength to the market, and was the cause of the all-round advance in values. The bull party, seeing its advantage, accelerated the movement by sharp manipulation in several stocks, notably Chicago Gas and Jersey Central. The market was completely professional, showing no sign of an outside interest.

The only feature in the electrical stock market was General Electric. A vast amount of matter calculated to have a bear effect upon the stock was published during the week. The crowning article was the inspired statement by the *Chronicle* that the $1,000,000 debenture bonds retired by the company during the year was not accomplished from surplus earnings, but from proceeds realized on various assets. None of these articles have affected the stock. It is reasonable to suppose that present owners, who largely represent the management, know the value of their property, and if it is intrinsically worth 10, as is claimed by some, the question naturally arises why do not these interests sell out? They have certainly had excellent opportunities to do so between 30 and 40 during the past year. The price during the week was fairly steady about 34.

Messrs. Tucker, Anthony & Company, of Boston, have purchased from the General Electric Company the Macon Consolidated Street Railway Company, of Macon, Ga. There are $300,000 bonds on this property and $500,000 stock. The stock has already been subscribed for by the clients of the banking house.

The annual meeting of the Edison Electric Illuminating Company of New York will be held on Tuesday. I am told that the annual statement will show a surplus after dividends of $150,000. The stock sold in moderate quantities between 99 and 99¾.

The directors of the Bell Telephone Company have decided to sell the remainder of their stock at auction, to whom rights were given at 90. About 3,300 shares of the first lot of 5,000 remain unsubscribed for by the stockholders. Details of the sale are left to the executive committee.

On the Boston exchange, Bell Telephone advanced 1½ points to 193½ and closed the week without net change. Erie Telephone advanced 1 point to 53¾ bid and 54 asked. New England Telephone's bid price advanced from 67 to 68. Fort Wayne Electric was weak at 1½ bid and 2 asked. Westinghouse preferred weakened somewhat to 49½ bid and 50 asked. The common stock was unchanged at 32¼ bid and 33 asked.

BAIN.

New York, January 12, 1895.

Successful Long Distance Electric Transmission Plants.

TO THE EDITOR OF ELECTRICAL REVIEW:

In the New York *Sun* of the 6th inst. is an article taken from the ELECTRICAL REVIEW on the electrical transmission of 1,800 horse-power from the Falls of Juanacatlan, Mex., to Guadalajara, a distance of 17 miles. There are now in the United States a number of plants of this description in operation that fully equal the Mexican one, both as to the horse-power used and the distance it is transmitted. Several of these plants have been in operation from three to six years, and seem to have attracted no attention. This is more the remarkable from the fact that, as far as I am aware, they are all a success financially, some paying as high as 50 per cent annually on the original outlay. The following examples have come under my notice. The San Antonio Light and Power has been transmitting power a distance of 30 miles for several years. It recently tested its ability over a 90 mile circuit with perfect success. The Roaring Fork Electric Light and Power Company has been transmitting power four miles for six years. The Gold King Mining Company transmits 1,000 horse-power 10 miles. The Sutro company has been transmitting 300 horse-power for five years. I believe the distance is four miles. Six of the wheels here work under a head of 1,680 feet and one wheel under a head of 2,100 feet. This is four times the height of the Washington Monument. A nozzle tip one-half inch in diameter gives 100 horse-power.

The Redlands Electric Light and Power Company have been transmitting about 800 horse-power, night and day, for the past year a distance of seven miles; total expense for repairs during that time, $10. The Portland plant transmits power from the Willamette Falls to Portland, Oregon, 15 miles. I do not remember the horse-power. The Cœur d'Alene plant has been running successfully for three years, supplying the town of Burke, Idaho, with light and power. The Standard Mining Company has been transmitting light and power a distance of 13 miles for nearly three years. The Caroline Mining Company near the summit of Mt. Sneffles, California, in the region of perpetual snow, has been supplied with light and power for the past four or five years from a waterfall four miles below. This mine cannot be operated with success by any other method. It is easy to find numerous other instances in this country that are full of interest but are quite unnoticed.

The most interesting examples of this kind of work are the plants now in course of construction. Of these the one at Niagara in the East and at Snoqualmie Falls in the West are the largest. These will be the largest electric plants in the world, and each proposes to transmit from 5,000 to 15,000 horse-power on commencing operations a distance of 23 to 26 miles, with much greater extension as the near markets are supplied. They both expect to be in operation this year. The Snoqualmie company has been offered a contract by the coal mines near its line to supply them with power for pumping and hoisting as well as light. This offer has been accepted. The superintendent of the coal mines says, "It pays to use electricity, as the cost is no greater than at present and the danger of fires and hot steam pipes is avoided. It is easy to see what an immense field there is open to such enterprises as can supply electricity cheaper than coal at the mine.

Yours truly,

R. M. SMYTHE.

New York, January 12.

American Institute of Electrical Engineers.

The 93d meeting of the Institute, will be held at 12 West 31st street, New York city, on Wednesday, January 16, at eight P. M. A paper will be presented by Professor Alexander Macfarlane, of Ithaca, N. Y., "On the Units of Light and Radiation." The author expects to be present. A paper will also be presented by Mr. Alton D. Adams, of Boston, entitled, "The Best Metal for Field Magnet Frames."

A meeting of western members will be held the same evening, Wednesday, January 16, eight P. M., at Armour Institute, 33d street and Armour avenue, Chicago, where, in addition to the above papers, Professor Stine will present an illustrated historical sketch of the first three-wire Edison plant at Sunbury, Pa. If time permits, this matter will also be taken up at the New York meeting.

Mr. Jarvis B. Edson, widely known in engineering and electrical circles, has recently completed a magnificent residence in the most select part of New York city, and will make his Winter home there. The edifice was built under Mr. Edson's trained eye, and is one of the most complete houses in the vicinity of West End avenue. Mr. Edson has, also, a very commodious cottage and extensive grounds on Shelter Island, L. I., where the Summer months are enjoyed.

John R. Spears, of the New York *Sun*, who has traveled in more out-of-the-way places than any man in American journalism, recently made a great trip along the coast of South America, following in the wake of the old-time South-sea peddlers and pirates along the coast of Patagonia and through the Straits of Magellan. He has written an article about his adventures entitled, "The End of the Continent," which will appear in the February *Scribner*, with many pictures from his unrivaled collection of photographs.

BROOKLYN TROLLEY EMPLOYÉS STRIKE.

EIGHT THOUSAND MEN MAY GO OUT AND TIE UP SIX HUNDRED MILES OF ROAD.

Early on Monday morning a big strike of electric railway motormen and conductors was inaugurated in Brooklyn, N. Y., upon the orders of the Knights of Labor leaders. There are nearly 8,000 men employed on the lines and in the stations of the various Brooklyn electric railway companies. The strike may include these, and perhaps extend to the employés of the elevated roads. For two weeks past the labor leaders have been in almost constant conference with Col. John N. Partridge, president of the De Kalb Avenue line, President Benjamin Norton, of the Atlantic Avenue line and President Daniel F. Lewis, of the Brooklyn Heights company. The men asked for an increase in wages, a difference in the arrangement of "trippers" and that the delays at the end of a route be included in their time. President Lewis afforded the leaders every opportunity for argument, but was firm in his position. He said positively that the road could not increase its operating expenses over those of last year. He said the road would certainly be run in the interests of the public and the stockholders, and that next to these the men would be considered. Efforts to compromise were unavailing, hence the strike was ordered.

At noon on Monday, the only lines in operation were those on Jay and Smith streets, which belong to the Brooklyn and Coney Island company, of which Henry W. Slocum is president.

Arrival of a Big Dynamo at Niagara Falls.

The first of the three great dynamos for the Cataract General Electric Company, of Niagara Falls, N. Y., arrived there last Friday, and will be placed in position immediately. Prior to its shipment this unique and powerful machine was thoroughly tested in the shops of the Westinghouse company at Pittsburgh, and was found to be capable of making 261 revolutions to the minute, eleven above the required number. Shafting and hydraulic connections for the dynamo are already in place and the prospects are now that the power will be ready for distribution by the first of February.

In Memoriam.

We have received from the Standard Underground Cable Company, for which he was western manager, a memorial to Mr. Frederick E. Degenhardt, in which a brief review of his active life is given. Mr. Degenhardt was very widely known, exceedingly popular and his loss is mourned by a large circle of close friends. The company announce that their Chicago office will continue and that later on the name of Mr. Degenhardt's successor will be announced.

PECULIAR TELEPHONE TROUBLES CAUSED BY ALTERNATING CURRENT DISTRIBUTION.

BY E. W. MIX, IN LONDON "ELECTRICIAN."

The importance of the inductive influence of an alternating current distribution on telephone systems is well shown by some disturbances which developed at Odessa during last Summer.

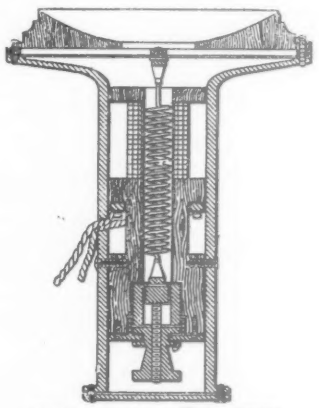
The telephone lines are all overhead, and the apparatus is of the American Bell telephone manufacture. The dynamos in the central station are of two types, one for 40 ~, and the other for 125 ~. The primary potentials of the circuits are 1,800 and 2,000 volts, respectively. The 40-cycle machines alone had been used for the lighting of the municipal theater up to the time of the development of the disturbances. The secondary distribution of the theater was made at 60 volts, and the total energy consumption about 80 kilowatts. It had always been possible to detect a slight induction on the telephone lines passing near the theater when the 40-cycle dynamos were running, yet the influence was insignificant. When, however, the theater line was branched on the 125-cycle dynamos the disturbances were quite important on certain lines running in the neighborhood of the theater.

It was at first thought that the source of the trouble would be found to be the induction produced by the overhead primary lines, but the telephone wires most influenced crossed these lines at right angles. The group of about 20 telephone wires most influenced passed from supports on the roof of one building to another about 20 metres high along the side of the theater, but about 10 metres from the side walls, or fully 30 metres from the center of the theater, or, so to speak, center of gravity of the distribution. The distance between the telephone wires and the primary wires at the point where they cross is about seven metres.

It being thought that the secondary circuits might alone be the cause of the troubles, a temporary load was made up for the secondary circuits in the transformer room by means of water rheostats. The load thus placed on the primary circuit was made even more than the normal; but, under these circumstances, all disturbances ceased to exist.

Investigation as to the arrangement of the secondaries led to the discovery that a great many circuits, and especially those for lighting the four galleries, were made on the loop system; *i. e.*, where the current enters at one end of the circuit and leaves at the other, for the purpose of assuring an equal potential on all lamps in that circuit. In the gallery circuits the current enters at one side of the theater and leaves at the other, so that the effect at a considerable distance from the circuit was the same as if a single conductor were placed around the gallery carrying a current equal to that of the circuit. This current was unusually large on account of the distribution being made at 60 volts only. These four circuits passing around the theater in this way produced a very strong magnetic field, the axis of which was practically coincident with the axis of the theater. This field embraced to a certain extent the group of telephone wires, and gave rise to the trouble.

In order to gain a more definite idea of the extent and distribution of the magnetic field so produced, an exploring coil was made up, consisting of about 100 metres of insulated wire wound up into a coil about 1.20 metre in diameter, and the two terminals connected to a telephone receiver. By carrying this coil around inside and outside the theater, holding the receiver to the ear and turning the coil in different positions, it was very easy to determine the direction of the lines of force at any point, and the intensity of the noise in the telephone



THE OHNESORGE TELEPHONE.

was a good measure of the strength of the field.

When all the circuits were on, the effect was very noticeable on the iron roof of the theater at a level a little above the group of telephone wires. On the ground outside the theater and immediately under the wires the influence was also well marked. It is very likely that the iron roof added to the effects on the telephone wires in concentrating the lines of force which escaped from the edges of the roof and cut the wires near by. The iron roof acts somewhat as a pole piece to the magnetic field.

The same trouble developed at about the same time in another theater where the wiring of the gallery circuits had been made on the same loop system. Here it was easy to locate the trouble because the circuits were more distinctly separated The influence was only exerted on two telephone wires which passed over the roof of the building. The instant these loop circuits were switched on the noise in the telephone was noted. The intensity of the noise in each case had no relation to the load on any other than the loop circuits, so that it was plainly demonstrated that these circuits were the cause of the trouble in both theaters. The remedy in such cases is naturally the suppression of the loop system, and especially in cases where high frequency alternating currents are employed.

The importance of electro-static induction effects on telephone lines was forcibly brought out by a condition which existed one day, and which was conclusively proven by experiments afterwards. It was found that a new disturbance was set up in a part of the city heretofore unaffected. Here there was a new branch of the primary line installed running parallel to a group of telephone lines for a distance of about 350 metres. The primary wires were on wooden poles about seven metres from the ground, and the telephone wires also on wooden poles about 11 metres from the ground, but on the opposite side of the street, the distance between the two lines being at least 20 metres. There were as yet no transformers branched on this line. The effect was first noticed on a line which ran but about 30 metres parallel to the primary lines and then crossed them at right angles. It was supposed that both primary wires were connected to the line circuit, but investigation showed that one had been by an oversight left disconnected. When the connection was established the disturbance ceased. Here the effect was purely electro-static. The insulation of the primary line was perfect, so that the disturbances could not be attributed to any leakage to ground.

To more fully determine the extent of the electro-static influence, the experiment was tried of connecting one pole of the dynamo to a circuit leading out in one direction from the station, and connecting the other pole to a circuit leading out in the opposite direction. By this combination no current was sent out on any of the lines, except that necessary to give them an electro-static charge. The disturbance set up in almost all the telephone lines of the city was such as to almost completely prevent communication. So long as only one circuit was so connected to but one pole of the dynamo the influence was just sufficient to enable one to determine that the dynamos were running; but on connecting the two circuits, as described above, immediately the disturbances were set up. The insulation of the lines with the transformers connected was in the neighborhood of 300,000 ohms. The length of double line of one circuit was about eight kilometres, and that of the other, five kilometres. No current could be detected flowing out on these lines by means of the amperemeters, which were fairly sensitive instruments, and where one ampere could have been quite easily noticed.

The conclusions are, therefore, that electro-static induction is quite as, if not more, capable of creating telephonic disturbances than electro-magnetic induction with high frequencies and potentials, and precautions should be taken to keep the two conductors near together, so that one may neutralize the other. In electro-static induction the earth, or even buildings, serving as an intermediary conductor of large capacity, tend to increase the area of influence of the electric charges received by the primary wires.

The Ohnesorge Telephone.

Herr W. Ohnesorge, of Frankfort, Germany, has recently introduced a telephone presenting some novel features. Telephones with wire cores have hitherto been distinguished for their precise working, but have had the disadvantage of rendering sounds very faintly. Herr Ohnesorge discovered that if the spiral iron wire forming the core project from the coil by a certain amount, the strength of the sound is increased in a manner quite out of proportion to the difference in position. The discovery is utilized in the instrument, of which the accompanying illustration, from the London *Electrician*, shows the details.

The spiral spring forming the core is of steel or iron wire, thoroughly hardened, and with the turns just so far apart as not to touch. This spring is of such a size as to permit free movement inside the tube of the bobbin without touching the sides, and is made of wire one millimeter in diameter. The one end is fastened to a sounding board in front of the telephone, while the back end, projecting behind the coil by about the length of the latter, is fastened to an adjustment screw, which regulates the tension on the spring.

Such an instrument speaks loudly and clearly, and renders song or musical tones perfectly. Steel wire speaks less loudly than hardened iron wire and magnetizing the spring also increases the volume of sound; the latter course is necessary if the instrument is to be used as a transmitter. It is found that if in the center of the spring, or at several equidistant points the adjacent turns are more widely separated than the average, the sound is also increased and the spring appears to oscillate sideways as well as longitudinally; and the same effect is produced by putting the spring skewed in the coil. The telephone is very simple, cheap and easily regulated.

The Chloride Accumulator.

The business of the Electric Storage Battery Company, of Philadelphia, manufacturers of the chloride accumulator, is progressing favorably. Several important undertakings in storage battery work will soon be commenced by the company, and some important and valuable developments are looked for as a result.

The company is in a position to supply a type of accumulator especially adapted for telegraph service and for use in central telephone exchanges. There is a market for about 250,000 telegraph batteries and about 200,000 for telephone exchange work.

Who Knows of Such a Book?

TO THE EDITOR OF ELECTRICAL REVIEW:

We wish to secure a book or pamphlet containing blank specifications for the furnishing of municipal electric light plants. If you know of any such book and will send us a copy of the same we will be very grateful to you.

Yours truly,
Western Electrical Supply Company,
G. W. JOHNSTON, president.
Omaha, Neb., December 29, 1894.

A THEORY OF ELECTRICAL VISION.

ABSTRACT OF A PAPER READ BEFORE THE EDINBURGH MEDICO CHIRURGICAL SOCIETY, BY DAWSON F. D. TURNER, M. D.

According to the late Professor Clerk Maxwell light and radiant heat are electro-magnetic waves of the ether, and they only differ from each other as a high note differs from a low note. In order that we may be made aware of this wave motion we must be provided with a proper detector. When the waves are short and of rapid vibration they affect the eye, and we are sensible of light; when they are somewhat longer they affect the cutaneous nerves, and we feel the sensation of heat; but if the waves be still longer we are not provided with any means of detecting them. We remain quite unconscious of them. Professor Hertz and his followers, however, have shown us how to construct detectors of these longer waves, and such detectors I desire to show to the society to-night. A tube of iron filings is a bad conductor of electricity, but if an electrical discharge take place in its neighborhood then its molecules become so arranged that it becomes a very good conductor. Such a tube can then be used as a detector of electrical discharges; we might call it an "electrical eye." At present there is no current passing through the tube of filings, although it is in circuit with a battery. The galvanometer needle, as indicated by the spot of light, is at zero; if, however, I cause a few sparks to pass between the terminals of this induction coil—*i. e.*, if I cause long electro-magnetic waves to be emitted—then the tube of filings will be stimulated by these waves, and the molecules will become so arranged as to allow a current to pass; this will be rendered evident to us by the movement of the spot of light. Our electrical eye sees the discharge. If, however, I tap the table the molecules of the filings again become disarranged, and the electrical current no longer passes. Mr. Branly discovered about four years ago this reaction of iron filings to an electrical discharge; I have worked a good deal at the subject since, and in a paper contributed to the Royal Scottish Society of Arts last Winter I showed how such tubes could be used as electrical eyes or detectors, and also the range of their vision; viz., that they respond more readily to long waves than to short ones. It struck me at that time, and also previously when working with a somewhat similarly sensitive substance (selenium), that the eye might perhaps be constructed on a similar principle, and I find that Professor Oliver Lodge has since, in a paper read before the British Association at Oxford during last Summer, definitely suggested such an "electrical theory of vision." This theory is that in the eye, as he supposes—or in the brain, as I think—there is a source of electrical energy—that a current is, however, prevented from flowing by reason of certain molecules in the retina being in the condition of the unstimulated iron filings; that when light falls upon these molecules they become so arranged as to be good electrical conductors; that thus our electrical current is now set up; and that this, either directly or through the intervention of nerve impulses, gives us the sensation of light. In this connection it is of great interest to learn—and Mr. Noel Paton was kind enough to inform me—that there is a complete circuit between the brain and the eye, because efferent nerves have lately been traced to the retina. This circuit would accordingly be made up of the brain, the efferent nerves, the retina with its sensitive molecules, the optic nerve, and the brain. Darkness may be due either to the simple non-passage of the current in consequence of the rearrangement of the retinal molecules when no light falls upon them, or to a positive sensation arising from the same cause. In some respects the action of selenium affords a better analogy; for, in the first place, it is actually sensitive to vibration of the same wave length as the eye is sensitive to; viz., light; and, in the second place, no tapping back or mechanical stimulus is needed to again render it a very bad electrical conductor; an absence of light is all that is required to get the electrical current cut off. Further, the selenium is most sensitive to exactly the same kind of light that the eye is most sensitive to; viz., to yellow light. The galvanometer needle is most deflected when the selenium is illuminated with yellow light.

A Patent Exhibition.

The Commercial Exhibition Company will manage an international exhibition of patents and inventions at the Grand Central Palace, Lexington avenue and Forty-third street, New York city. The exhibition will begin about March 1 and last for a month.

J. H. Bunnell & Company's New Power Vibrating Gong.

In any line of staple electrical apparatus an instrument or machine which is entirely new, or practically so, in that a decidedly new result is produced, is always interesting. No kind of simple electrical apparatus is more generally known or made than electric bells, and it would seem that all possible changes had been rung in the various forms given to this staple article. The introduction at this late day by Messrs. J. H. Bunnell & Company, of New York city, of a new form of electric bell which, with an equal amount of current, is calculated to take highest rank in power and resounding stroke compared with all previous designs, marks an important step for greater scope and usefulness in electric bell work. Herewith is a description of this interesting bell, for which a patent has been applied by Messrs. Bunnell & Company, and which they are now supplying to the trade.

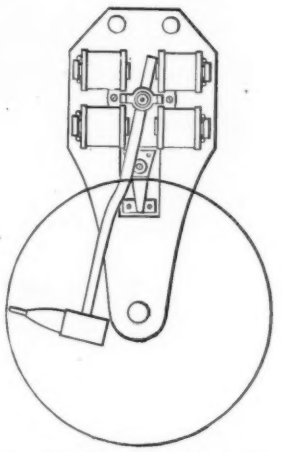


FIG. 1.—DIAGRAM OF J. H. BUNNELL & COMPANY'S NEW POWER VIBRATING GONG.

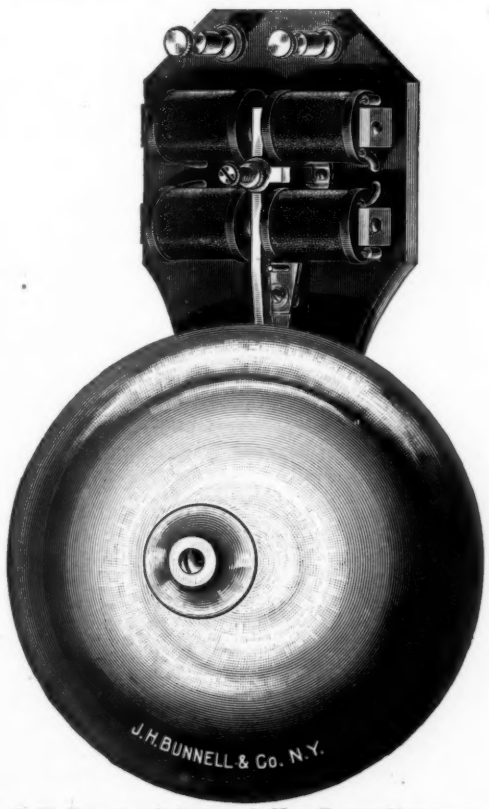


FIG. 2.—J. H. BUNNELL & COMPANY'S NEW POWER VIBRATING GONG.

The gong is shown in the accompanying illustrations, and is designed as a double acting loud alarm and signal bell for railway crossings, yards and stations, hotels, fire alarms and school calls. It is claimed to be the loudest and most powerful vibrating electric bell yet produced.

The action in this bell differs from all other forms in the following respects: No springs are used. The hammer is withdrawn after its forward stroke by an extra pair of magnets with the full power of the current, so as to give a strong rebound to start and assist the forward stroke which is then made with the added full force of the current by a separate pair of magnets. The hammer moves twice as far and is about three times as heavy as in the old forms. It does not have to overcome the force of any spring in its forward stroke, but is helped instead by a powerful recoil from the backward movement. The result is that with an equal amount of battery the power of the actual blow delivered on the gong is fully trebled as compared with the old method.

Buffalo Electrical Society.

The Buffalo Electrical Society has secured the services of Prof. Albert L. Arey for a course of 10 lectures on "Practical Electrical Engineering," to be given at the rooms of the society in the Library building, Buffalo, N. Y., commencing January 19, 1895, and continuing every alternate Saturday evening until the course is completed.

Professor Arey is a member of the New York University Extension course, professor of physics in the Rochester Free Academy, and is eminently qualified to place before an audience complicated problems in the most elementary manner.

The course of lectures will be of a practical nature, particularly suited to those who have a knowledge of the rudimentary principles of electricity. Professor Arey has a very complete outfit of experimental apparatus, and his demonstrations will be especially interesting and instructive. Further information relative to membership in the society and tickets to the lectures can be had of Frank C. Perkins, president, or A. C. Terry, secretary.

Contemptible Business Methods.

[*From Electricity.*]

The whole thing looks very much as though Mr. Johnston is reduced to very great business straits if he finds himself compelled in order to keep going to run around among the electrical public begging them not to patronize his competitors but to give all their patronage to him. Can a self-respecting advertiser patronize a man who would stoop to such methods? Can he by his patronage assist this blot upon the otherwise fair name of electrical journalism to live? Will he, by continuing his patronage, feed the cancer that is gnawing at the vitals of business honor?

We fancy that those who follow Puddin'head Johnston's advice and put all their eggs in *his* basket will also follow that other philosopher's advice and "watch that basket" mighty closely.

ELECTRIC LIGHT FLASHES.

At a municipal election on February 15, Tamaqua, Pa., will vote on the question of increasing the borough debt $25,000, for the purpose of erecting an electric light plant.

The question of securing better lighting for the streets of Cleveland, Ohio, is agitating the people. The council committee having the matter in hand has recommended that all the thoroughfares of the city be lighted with electricity.

The Edison Electric Illuminating Company, of Brooklyn, N. Y., makes the following annual statement:

	1894.	1893.	Inc.	Dec.
Gross	$421,073	$325,434	$95,639	.....
Net	231,746	189,395	42,351	.....
Misc. Income	36,529	22,485	14,044	.....
Total net	268,276	211,881	56.396	.....
Net for divs.	193,406	144,059	54,347	.....
Divs. paid.	168,750	98,277	70,473	.....
Surplus	29,656	45,782	.....	16,126

George M. Myers, of Kansas City, Mo., has been appointed general manager of the Southwestern Electric Light and Water Power Company of Joplin, Mo., and the Nevada Light Company, of Nevada, Mo. Mr. Myers will maintain headquarters in Kansas City.

Blackstone, Mass., has voted to offer the Woonsocket Electric Light Company, which now lights the town at the rate of 50 cents a light per night, 40 cents per light for the same service. If the offer is not accepted the town threatens to put in an electric plant of its own.

The city of Logansport, Ind., placed in operation on January 1 its own electric light plant, consisting of 152 arc lamps. The new system was built at a cost of a trifle over $50,000. The old Jenney plant, in which Robert Knight, of Fort Wayne, is chiefly interested, will continue to furnish incandescent light and heat to private consumers.

Findlay, Ohio, was enveloped in darkness on the night of January 1 as the result of the electric company that has a contract for the city lighting turning off the current from the public lights. This action is the result of the city council withholding payment of the electric light company's bills for an alleged violation of its franchise with regard to the height of the lights.

The plant of the York, Neb., Gas and Electric Light Company has been sold for $5,205. The original cost of the plant was $12,000. It was knocked down to John R. Pierson, cashier of the City National Bank, who is supposed to represent the leading stockholders in the old company. It is understood that a new company will be organized immediately to place the plant, which has greatly depreciated, in first-class order.

From present indications it is probable that the Edison Illuminating Company will abandon the St. Louis, Mo., city lighting contract should the proceedings instituted by the council to compel them to pay a five per cent tax on gross earnings be carried through. This would leave the city in an awkward fix, although the $50,000 bond of the Edison company would be forfeited. Should the Edison company give up the contract it would in all probability be let to the Laclede Gas Light Company.

The plant and equipment of the Fond du Lac Light, Power and Railway Company has been sold at sheriff's sale to Elihu Colman. The roadbed and track brought $323.53 and the plant and appliances, $4,367.29. The sale was made to satisfy loans on the plant. The original cost of the property was about $100,000. Mr. Colman is said to be acting for other parties whose names he will not give, and it is probable that the sale was made as a step towards a reorganization of the company. There were no other bidders.

The following table shows the number of arc lights in 18 of the larger cities in the United States:

	Population.	No. Lamps.
St. Louis	500,000	2,070
Boston	500,000	1,311
Baltimore	500,000	1,000
Cleveland	340,000	251
Buffalo	300,000	1,880
Cincinnati	300,000	2,000
Pittsburgh	275,000	1,594
New Orleans	250,000	948
Detroit	250,000	1,279
Milwaukee	240,000	692
Minneapolis	210,000	693
Providence	150,000	1,319
Omaha	150,000	363
Rochester	150,000	1,532
Syracuse	100,000	550
Albany, N. Y.	100,000	600
Toledo	100,000	600
Columbus	90,000	850

Proceedings for the voluntary dissolution of the Standard Gas and Electric Light Company, of Suffolk County, N. Y., have been taken in the Supreme Court, and Justice Andrews has appointed William D. B. Janes temporary receiver of the company. The application for the appointment of the receiver was made by Janes and Victor Cumberson, both directors in the company, which was organized in 1890 with a capital stock of $200,000. It is charged that the company has a number of judgments against it which it cannot pay, and that it is insolvent.

The following electric light companies have elected officers for 1895: Johnstown, N. Y., Electric Light and Power Company — president, John G. Ferris; secretary and superintendent, James H. Cross; treasurer, Richard Evans; auditing committee, James P. Argersinger and John G. Ferres. Dayton, Ohio, Electric Light Company—directors, J. C. Reber, R. M. Nevin, T. J. Weakley, A. Stuart, R. N. King, H. C. Keifaber, W. D. McKemy, J. E. Lowas. Edison Electric Illuminating Company, West Chester, Pa.—directors, R. T. Cornwell, Henry C. Baldwin, Thomas B. Brown, Frank P. Darlington, Joseph S. Evans, Abner Hoopes, Samuel Marshall, Isaac Massey and Plummer E. Jafferis.

Phœnix Carbon Manufacturing Company.

The Phœnix Carbon Manufacturing Company, of St. Louis, are now fully equipped for business and are running their new plant on De Kalb street to its full capacity. Orders are coming in satisfactorily and the business of the company, which has no connection with the so-called "carbon trust," promises to fully justify the hopes of the supporters of the company.

ELECTRIC RAILWAY NOTES.

Officers of electric railway companies are requested to send promptly to the ELECTRICAL REVIEW *notices of meetings, election of officers, declarations of dividends, financial reports and all items of interest in connection with the financial and practical operation of their roads.*

The Point Defiance, Wash., and Edison Street Railway has been sold to the General Electric Company for $82,000.

Northampton, Mass., and Hartford, Conn., will be connected by an electric railway within a short time if present indications count for anything.

The application of electricity to intramural transit has recently caused the expenditure of nearly $1,000,000 for the construction of power-houses and car barns in Chicago and vicinity.

Burglars broke into the office of the Sandusky, Milan and Norwalk Electric Railway office at Milan, Ohio, the other night, blew open the safe and stole $260 and a lot of tickets.

The Meigs Elevated Railway Company, Boston, will make application before the next meeting of the Board of Aldermen, January 21, for approval of locations for over five miles of Boston streets.

F. A. Nims has been appointed receiver of the Muskegon, Mich., Electric Street Railway. This action was taken because of the default of the payment of the interest on a mortgage of $24,000.

Why can not people make up their minds that rapid transit is the better, all things considered, and accept the fact that speed on the part of the cars requires more care and caution on their own part?—*Toledo, O., Blade.*

The Kansas City, Mo., Cable system and Metropolitan Cable will be consolidated on basis of present earnings, and unless certain agreements fall through every street railway in Kansas City will be under one management.

It is rumored that changes will be made in the management of the Jersey City, N. J., trolley lines, and that Charles B. Thurston, president of the Jersey City Horse Railway Company, which concern sold out to the Traction Company, will have charge of the Jersey City lines.

We have investigated and run to the ground all the rumors from New York that the control of the West End Street Railway Company has passed to a new syndicate, and so far as we can find the buying of West End common has been almost entirely for investment account.—*Boston News Bureau.*

John Kilgore, president of the Cincinnati Street Railway Company, is at the head of an enterprise that is being agitated for the construction of an electric railroad from Steubenville, O., to New Philadelphia, passing through Wintersville, Richmond and Amsterdam and midway between Harlem Springs an Carrollton.

The New York, New Haven and Hartford Railroad is said to be preparing to equip its Nantasket Beach and Warren and Bristol branches with electricity to replace the present steam power. The Nantasket Beach line is 10 miles and the Warren and Bristol 21 miles in length. The latter starts from Providence, passes through Fall River and terminates in New Bedford, Mass., a distance of 14 miles. It is stated that the company intends to ultimately equip all its minor branches with electricity.

The Electric Railway Company, of Savannah, Ga., has gone into the hands of John R. Young, as receiver, under appointment by the United States Court on the petition of H. A. Pevear, of Lynn, Mass. The petition charges that over $1,000,000 worth of stock has been issued by those controlling the combined companies and parcelled out without any fair valuation being received in return. The value of the company's property is placed at $500,000. It has for some months been engaged in war with lines of George Parson's, the street car magnate, and fares have been reduced to one cent.

The new lines which are being constructed in Connecticut between New Britain and Berlin, and New Britain and Hartford, are an extension of the lines of the Central Railway and Electric Company. The officers of this company are A. M. Young, president; C. S. Landers, secretary; F. G. Platt, treasurer. The line from New Britain to Hartford connects with the system of the Hartford Street Railway Company, and through cars will be run from Center Square, New Britain, to Center Square, Hartford, and it is anticipated that this line will be in operation by the first of June, and the line between New Britain and Berlin will be done and in operation by the first of May. The Berlin extension is about five miles long, and the Hartford extension about nine miles. The contracts for the rail have been given to Levis & Company, of Philadelphia, and they are to be 60 lb. tee; the bridge work was given to the Berlin Iron Bridge Company; ties to the New Britain Lumber & Coal Company; feeder wire, about 100,000 pounds, to the American Electrical Works, Providence; the trolley wire to Benedict & Burnham Manufacturing Company, Waterbury, Conn.; track construction to Frederick T. Ley, Springfield; the overhead electrical construction work to the New England Engineering Company, Waterbury, Conn.

National Electric Light Association.

The indications are that the attendance at the Cleveland meeting, on February 19, 20 and 21, will be very large and quite a number of the delegates intend taking their wives.

Hotel accommodations should be reserved early to insure comfortable quarters. The headquarters will be at the Hollenden Hotel, where the rates are: American plan, $3 to $5 per day; European plan, $1 to $3 per day. Other hotels in close proximity to the Hollenden are: The Weddell, $3 to $5 per day; the Stillman, $3 to $5 per day; Forest City, $2 to $3 per day; Kennard, $2 to $3 per day; American, $2 per day.

THE ELECTRICAL TRANSMISSION OF FOOD.

BY ROY L. M'CARDELL IN "PUCK."

From where I sat in the café I could plainly hear the conversation between the two men. One had the smug air of a well-to-do member of the middle class. His companion was shabbily, even seedily, dressed, with unkempt hair and a dark saturnine cast of countenance. It was the latter who was talking.

"You laugh at me," he was saying. "Yes; so they laughed at Morse when he said he could transmit messages to any distance. They laughed at Bell when he told of sending sound; they laughed at Edison when he spoke of transmitting light. Do they laugh at these men now? Were these, are these, more absurd than my proposition? And here I sit powerless, because, forsooth, I lack the few dollars necessary to purchase the chemicals to make my last experiment." The smug man only laughed again, finished his cocktail, clapped his companion on the back, bid him good-by and walked out, leaving the other despondently gazing at his fingers. I am naturally of an inquisitive disposition, and this conversation had roused my curiosity.

I arose and politely accosted the melancholy man. "You will pardon me," I said; "but, overhearing your conversation with the gentleman who has just gone out, I became much interested. If I can be of any assistance to you, and if it is within my means, I would be glad to help you." The melancholy man brightened up considerably, and motioned me to a seat beside him.

"It is simply this, sir," he said; "you see before you the most miserable of all men, a poor inventor. For years I have toiled upon a scheme to benefit mankind by a new and heretofore unthought of application of electricity. I will not confuse you by technical details, sir. My invention is nothing more or less than the transmission of food by electricity."

Noticeing my look of incredulity, he added: "It is simplicity itself, sir. If Professor Gray's telephote can reproduce handwriting, diagrams and outline pictures in its experimental stage, why can I not, by my great invention in its perfection, transmit food? My preliminary experiments have been flatteringly successful. I have but one more vital one to make to prove the success of my apparatus. When I have done that, sir, my name will be famous. I work a revolution in domestic economy. The drudgery of the kitchen will be a thing of the past. The poor will be fed, the vital essence of nourishment will be transmitted by electricity alike to the high and the low; dyspepsia will be unknown; from one central generator in every city a myriad network of wires shall run; a simple bulb will be placed in the mouths of those who are hungry, and electricity will do the rest. My apparatus at the central stations will be assimilating food, my wires shall be transmitting it, and in a pleasing manner, alike agreeable to the palate and stomach, a nation will be nourished. From the millionaire's dinner of courses to the invalid's simple broth, from the workingman's hearty meal to the infant's sterilized milk, from the quick lunch of the clerk to the after-theater Welsh rarebit of the *dilletante*, I shall feed them all!"

I looked at the speaker. He was as a man transfigured. His form was erect, his eyes bright. I forgot his hollow cheeks, his seedy clothes. "How much do you need?" I gasped.

"Just a pitiful five dollars, sir," said the inventor.

That night and the succeeding day my head was in a whirl. I could hardly grasp the vast possibilities of this wonderful invention, and I could hardly wait until it was time to keep my appointment, in the same place, with the genius I had met by happy chance.

He was there. In fact, he looked as if he had been there since last I saw him. He had evidently used my five dollars in purchasing chemicals; but had I known what chemicals he needed he would hardly have had the money. He was still sanguine, however. "'Speriment great (hic) succshesh!" he murmured.

"What was it you tried to transmit first?" I inquired, coldly.

"Whisky. What ye think?" replied the electrician, as he dreamily closed his eyes.

"That's a great scheme he has, sir," said the bartender in an awed whisper, as my genius sank down in his chair in peaceful slumber.

"His apparatus for the electrical transmission of food?" I inquired.

"Oh, no!" said the bartender; "his fairy tale for catching suckers!"

PERSONAL.

Mr. N. B. Burleigh has been appointed electrical inspector at Concord, N. H., at a salary of $1,200.

Mr. Henry F. Kellogg, representing the Whitney Electrical Instrument Company, of Boston, was among the visitors to New York last week.

Mr. Frank B. Parsons, who has a large acquaintance among electrical men, has severed his connection with the Davidson Ventilating Fan Company, of Boston.

Mr. J. H. Allen, of Atlanta, Ga., who is the publisher of our successful Southern contemporary, *Dixie*, and chairman of the committee on machinery for the Cotton States and International Exposition, favored the ELECTRICAL REVIEW with a pleasant call last week.

MR. INSULL ON EUROPEAN ELECTRICAL PRACTICE.

OBSERVATIONS OF A TRAVELER.

Mr. Samuel Insull, president of the Chicago Edison Company, landed in New York last week after a seven weeks' tour in Europe. Mr. Insull visited London, Paris and Berlin, and was afforded special facilities for inspecting all kinds of electrical work in those cities. In the course of an interview with a representative of the ELECTRICAL REVIEW, Mr. Insull expressed himself as follows:

"In the city of London at the present time about £6,000,000 sterling is invested in the electric lighting business. The rapid progress of this branch of the industry is shown in the fact that about £5,000,000 of this has been invested during the last five years.

"One of the most interesting sights I saw in London was a group of several Parson's steam turbines, of between 500 and 600 horse-power each, directly connected to dynamos in the Manchester square station of the Metropolitan Supply Company. These machines were installed to take the place of belted machines run from engines, and their principal object was to overcome the vibration formerly caused by the engines to such an extent that the matter got into the courts on complaint of property holders in the vicinity of the station. The turbines simply stand on the floor and run with perfect steadiness. No tests of their efficiency have yet been made, but the people in charge of the station have observed that their coal pile lasts longer than it used to.

"With a party of engineers from the Western Railway of France, I made a trip to a place just outside of Paris to inspect the Heilmann electric locomotive. It is practically a central station on wheels. The engineers claimed that it has a higher economy than a steam locomotive, has higher speed, draws heavier loads, and the wear and tear on the track is less than that caused by a steam locomotive. Heilmann is building two more electric locomotives, which will be run under a contract with the Western Railway of France over its lines for two years.

"In Berlin I saw nothing especially new, the electric lighting business being run on practically the same lines as four or five years ago. Their basis of operation is practically the same as that of the large low tension Edison systems in this country.

"Generally speaking, Europeans are doing nothing better than we on this side the water. But in systems of distribution they are doing things that we are talking about. Five years ago European central station practice was far in advance of that in the United States. To-day we are about neck and neck. I noticed some advancement in the economical distribution of current, not in large centers, but in reaching distant points.

"From what I have recently seen in Europe," concluded Mr. Insull, "I have a greater belief than ever in the low tension direct current system, although I have seen some magnificent alternating current work."

Mr. Dana's Opinion.

It is better not to have such a great circulation rather than to sell so few papers.—*N. Y. Sun.*

The Indianapolis *Sentinel* says a telephone company is arranging to put in a telephone exchange at Hammond, and that it is to be ready by April 1. We wish the new company full success, but the date of its opening is a little dubious.

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KINDRED INTERESTS

The Partridge Carbon Company, of Sandusky, O., is running its factory overtime, getting out orders for the Partridge self-lubricating brush. Electric railways are now realizing the value of the product of this company.

The Fontaine Crossing and Electrical Company, of Detroit, Mich., have a unique product in the Fuller double voltage dynamo, the only machine of its kind in the world. It presents advantages which should appeal to the consumer.

The Metropolitan Electric Company, 186–188 Fifth avenue, Chicago, have recently been making some changes in their store and have put in some new counters and shelving, thus adding to its attractiveness and furnishing better facilities for the display of their increased line of goods.

The new car barn for the Lehigh Traction Company, at Hazelton, Pa., is to be built by the Berlin Iron Bridge Company, of East Berlin, Conn. The same company have a contract for the new power house for the Keene Gas Company, at Keene, N. H., and are also putting up a large iron bridge at Collinsville, Conn.

Herrick & Burke is the name of a new electrical engineering firm which has just been established at 203 Broadway, New York city. The members of the firm are: Albert B. Herrick, who has been connected with electric lighting since 1879 and is a switchboard specialist, and James Burke who has made a specialty of designing and constructing street railway and stationary motors, generating apparatus and direct-driven dynamos. The ELECTRICAL REVIEW wishes prosperity to the new firm.

The Columbia Incandescent Lamp Company, St. Louis, report that the new year opens bright and prosperously for them. They have just completed a large addition to their factory and are adding boilers and engines for an increased output. The new Columbia high economy lamps are stated to be giving excellent results. The Columbia company look for a much increased trade during 1895, and say they will be greatly disappointed if in a year from now they are not making twice the number of lamps they are to-day and selling them at fair and profitable prices.

The new power station for the United Electric Light and Power Company on West Twenty-eighth street, New York, is now being put in place by the Berlin Iron Bridge Company, of East Berlin, Conn. This will be a model station and one of the most complete and perfect in the Eastern States. The engine and dynamo room is 100 feet square, and the boiler room 60x100 feet. The roof covering on the dynamo room is to be the Berlin Iron Bridge Company's patent anti-condensation corrugated iron. The coal pockets in the boiler room are to have a storage capacity of 3,000 tons of coal.

The Abendroth & Root Manufacturing Company, New York city, makers of the well-known Root water tube boiler, report the following as among numerous sources from which they have received recent orders: Cincinnati Street Railway Company, three orders; Baltimore & Ohio Railroad tunnel plant, two orders; Frazar & Company, Tokio, Japan, and New York, five orders for boilers in electric lighting plants; Hamilton, Ohio, municipal electric light plant; Armington & Sims, Providence, R. I.; the United States Capitol, Washington; Carnegie Music Hall, New York city; Castle Garden Aquarium, New York city. Mr. Albert A. Cary, M. E., is the efficient and capable superintending engineer for the Abendroth & Root Manufacturing Company.

The Mather Electric Company, of Manchester, Conn., report a very bright outlook for the year 1895, and state that the company has at no time during its existence had so many orders on its books as it has to-day. The company now have in course of construction in their works at Manchester the following apparatus on orders: Five 200 kilowatt, twelve 100 kilowatt, one 80 kilowatt, eight 60 kilowatt, three 45 kilowatt, three 30 kilowatt belted generators of their new multipolar type; also, three 100 kilowatt, one 80 kilowatt, two 65 kilowatt, two 50 kilowatt and one 30 kilowatt direct connected generators of their new multipolar type; and, also, 31 ring type dynamos and 70 Manchester motors of various sizes. Notwithstanding the extensive additions in the way of new tools and facilities which have been added recently to their Manchester plant, the company have found it necessary for the last two months to operate their entire plant 24 hours a day with two shifts of men, but so far have been unable to keep up with their orders. The first three days of January the Mather company closed contracts for 10 generators, aggregating 1,300 kilowatts, for railway and power work.

$25 to $50 per week, to Agents, Ladies or Gentlemen, using or selling "Old Reliable Plater." Only practical way to replate rusty and worn knives, forks, spoons, etc; quickly done by dipping in melted metal. No experience, polishing or machinery. Thick plate at one operation; lasts 5 to 10 years; fine finish when taken from the plater. Every family has plating to do. Plater sells readily. Profits large. W. P. Harrison & Co., Columbus, O.

WILL ELECTRICITY CURE RHEUMATISM?

INTERESTING LETTER FROM DR. MONELL—WE SHALL BE GLAD TO RECEIVE TESTIMONY RELATING TO THIS SUBJECT.

TO THE EDITOR OF ELECTRICAL REVIEW:

A watchman or janitor in the Thomson-Houston electric light station, 425 East Twenty-fourth street, New York city, a man about 60 years of age, recently told me that he had been for 30 years a sufferer from rheumatism. He had been employed in the electric light station, however, for the last three years, and for nearly all this time he had been free from rheumatism. He also stated that not a man in the station had rheumatism, and he considered the immunity due to the electricity.

The relation of electricity to the cure of this painful disease is one of great interest to medical science and deserves to be fully investigated. Knowing your very great resources for obtaining news from all electric lighting companies, I beg to ask if you will set on foot a careful inquiry of managers of stations as to whether it is a fact that men who were formerly rheumatic cease to be so while employed in central stations.

If the facts can fairly be gathered and published in your splendid journal, you will make a valuable contribution to medical research. If there is any difference between stations using constant and those using alternating currents in this respect, it should be noted. Your great experience in securing facts for your enterprising journal will suggest to you how the inquiries can best be made, and I trust that you will feel interested to undertake the matter.

Very truly yours,
A. H. MONELL, M. D.
New York, January 2, 1895.

The National Convention of Manufacturers.

The assembly in Cincinnati on January 22, 1895, will be a convention fairly representative of the manufacturing interests of the United States. It will be an experimental assembly. Its object in the first instance is simply to consider and reach conclusions on the main question, *i. e.*, that of forming a National Association of Manufacturers.

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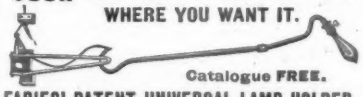

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